Plant Science Says

Happy Valentine's Day

February 2012

New Faculty

The faculty met on January 11 to consider the addition of the following four colleagues: Dr. Alice Pilgeram, Dr. Cindy Morris, Dr. Tamara Goetz and Robyn Klein. All four were voted on and approved. Following is additional information on each of them:

Dr. Alice Pilgeram - Assistant Research Professor

Alice has been with our Department for approximately 20 years. She received her doctorate from Montana State University and has been working with David Sands since then. This past year she was named the Co-Director of the BioBased Institute. In this position, she is working with Duane Johnson to develop value added agriculture for Montana producers.

Dr. Cindy Morris - Affiliate Professor

Cindy has been here since last September as a visiting scientist from the *Institut National de Recherche Agronomique* (INRA) in Avignon, France. She is working conjointly with Dave Sands, the Center for Biofilm Engineering (lab of Anne Camper) and the Image and Chemical Analysis Lab in the Department of Physics. Her research concerns aerial dissemination of bacterial biofilms from plant surfaces. In particular, she is measuring

the physical forces required to break off bacterial biofilms from leaf surfaces, studying the role of leaf-surface properties in release of biofilms into the air, and the properties of air-borne biofilms that assure bacterial survival and long distance aerial transport. One of the long term goals of this project is to understand how leaves act as launch pads for plant-associated bacteria - and particularly ice nucleation active bacteria that could induce freezing of cloud water. If these bacteria foster precipitation via contact with cloud water, then results from this work could lead to the design of cropping strategies for enhancing rainfall.

Dr. Tamara Goetz - Affiliate Assistant Professor

Tami received her B.S. and M.S. in physiology from the University of Missouri-Columbia and her Ph.D. in biochemistry/bio physics at Washington State University.

She gained post-doctoral experience at the Huntsman Cancer Institute in Salt Lake City, Utah. January of 2000 she took on the role of director of the Biotechnology Program at Salt Lake Community College. In this capacity, she developed the new 2-year program for undergraduates at the college, while also helping to create the one-year high school biotechnology program that is currently offered at 14 schools in the Salt Lake valley. Current projects and activities include launching of BioSTAR which is a non-profit student contract research organization that provides high school and college interns work experience, selection to the Governor's State Advisory Council for Science and Technology, development of a new Biomedical Manufacturing program and creation of a European Community/US student and faculty exchange consortium.

Tami is currently working on collaborative research projects with Dave Sands involving magneto tactic and ice nucleating bacteria and coteaches BioTech Frontieers in the summer.

Robyn Klein - Adjunct Instructor

Robyn Klein received her Masters of Science in the Dept of PSPP in May 2004. Her research focused on the phylogeny of plants having stress adaptation properties (adaptogens) and phytoecdysteroid compounds (insect hormones synthesized by plants). She teaches PS rubric courses through the Burns Telecommunication Center and the Masters of Science in Science Education Program at MSU: Herbal Medicine, Herbal Medicine Laboratory, Medicinal Plants of Montana (field trip), Medical Botany, Flowering Plants of the Northern Rocky Mountains, and Plants, People, and Health. She also teaches Edible Plants and Medicinal Herbs through the Yellowstone Institute in the summer, and presents workshops around the country at herbal medicine conferences. Robyn is a peer-reviewed professional member of the American Herbalists Guild, and has a 20-year history in herbal medicine. She is currently a visiting lecturer at the School of Integrated Health, University of Westminster in London, England. She says, "I am honored to be a member of the Department of PSPP faculty. Medicinal plants and nutritionally important crops are increasing in their importance to consumers. My contributions have attracted students to our department and can help support the growing interest in medicinal plant research. The chemical compounds important to herbal medicine and nutrition are the very same used by plants to protect themselves from pathogens and environmental stress."

MNLA Annual Meeting & Trade Show
By Yousef Zadegan

Yousef Zadegan, Tracy Dougher and Toby Day(graduate student) attended the Montana Nursery and Landscape Association Annual Meeting & Trade Show held in Billings from Jan. 5 to Jan. 7, 2005. This year's educational seminars included a variety of topics on native plants, annuals in the landscape and marketing. However, an excellent paper on Using Native Grasses in the Landscape was presented by Mark Majerus(Bridger Plant Material Center) and Dr. Linda Chalker-Scott of the University of Washington provided an in-depth review of current Sustainable Horticultural Practices for Healthy Landscapes. The program included a banquet, awards, scholarship fundraiser, and entertainment. There were several Horticulture/Landscape Design graduates at the seminar, most of them holding key positions in the Montana Nursery & Landscape Industry.

Enjoying the Sun and Science in San Diego
By Norm Weeden

It was the largest Plant and Animal Genome Conference yet, with over 2000 registrants, and I don't think many were disappointed by the science or the weather. Air temperatures climbed to near 80°F, but not many of the participants spent time in the swimming pool—they seemed to be listening to the talks, examining the posters or talking to colleagues about projects. Workshops at PAG XIII started at 8 am on Saturday, including overlapping 2-hour sessions on the wheat, banana, forage & turf, mustards, and fruit and nut crops. The afternoon sessions featured citrus, cool season legumes, maize, sugar beets, barley, molecular markers, plant/pathogen interactions, allele mining, and QTL cloning. Sunday was no less intensive, with sessions on forest trees, sugarcane, warm season legumes,

rice, cotton, grape, rice blast, large insert libraries, plant reproductive biology, abiotic stress, cytogenetics, and proteomics. Monday, Tuesday and Wednesday were a bit more relaxed because most people needed time to read the 800-plus posters presented, talk with other participants and catch a bit of the sunshine that San Diego was offering. In the poster session, our department contributed a poster by Jamie Sherman et al. on starch synthesis genes in a progenitor of wheat and another by Smita Sutrave et al. on the relationship between starch synthesis and grain yield in wheat. Luther Talbert was co-author on a third poster about the wheat genome project.

The conference is an excellent format to catch up on advances in the genomics of your favorite crops and to learn about new techniques being applied in this field. However, this year I was most impressed with the use of genomics to help understand the biology of various organisms. There were terrific talks on the dog, flowering time in rice and systemic acquired resistance in several plants. The dog is one of the models used in cancer research, and although the cancer studies are still in progress, the total DNA sequence for the dog has recently been released, and many other interesting studies are nearly completed. For instance, size in dogs is primarily determined by two genes, one of which is on the X chromosome. The interactions between these two genes explain much of the difference between a Great Dane and a Chihuahua and also reveal why males are generally larger than females in this species. Even more interesting results should be published when studies on dog behavior are finished. Can you imagine if there were only a few genes that explained the difference between the personalities of a Rottweiler and a Labrador Retriever, particularly if similar genes are present in the human genome? (After all, we expect dogs to have most of the same genes as we do—that is why they make a good model system for cancer studies). There were a lot of jokes about screening people for these 'personality' genes and modifying behavior through genetic engineering!

The presentations in the plant reproductive biology workshop were particularly interesting because they focused on trying to explain the development of the flower using genomic tools. Most of the presentations started with the ABC model of flower development (briefly: A genes alone give sepals, A+B genes give petals, B+C genes give stamens and C genes alone give carpels). By looking at gene expression in various species, the speakers were able to show what modifications of the ABC model were required to explain the different flower types found in various species. For instance, lilies don't have sepals because the A and B genes are expressed simultaneously during early development of the flower. In the Buttercup family (Ranunculaceae), there seems to be considerable gene duplication, and the spurs on the columbine appear to be formed by a duplicated 'B' gene that is expressed in the cells that are going to form the spurs. Many other interesting features of plant flower development were presented together with genetic hypotheses for their presence. It looks like in a few years many questions about flower structure and development will have explanations at the genetic level, making new types much easier to produce. (Just a plug for the Plant Development and the Horticultural Genetics courses)

As always, I left with my head buzzing (and not just from the margaritas) and excited about all the possibilities on the horizon. I look forward for an update next year (same time, same place).

Hussein receives Doctorate

Hussen Abdel-Haleem received his doctorate in Plant Sciences and Plant Genetics on December 15, 2004. His advisor was Tom Blake. Hussein is currently working at the University of Georgia in Athens as a post-doc for one year. He and his family are looking forward to returning to Egypt. Congratulations Hussein!

Papers Published

Martin, J. M., J.E. Berg, A. M. Fischer, A. K. Jukanti, K. D. Kephart, G. D. Kushnak, D. Nash, and P. L. Bruckner. 2005. Divergent selection for polyphenol oxidase and its influence on agronomic, milling, bread, and Chinese raw noodle quality traits. Crop Sci. 45:85-91.

Hance, S.T., W. Grey and N.F. Weeden 2004. Identification of tolerance to *Fusarium solani* in *Pisum sativum* ssp. *elatius*. Pisum Genetics 36:9-13.

Grusak, MN.A., C.-M. Li, M. Moffet and N.F. Weeden. 2004. Map position of the FRO1 locus in *Pisum sativum*. Pisum Genetics. 36:6-8.

Flenniken, M., Liepold, L., Crowley, B., Willits, D., Young, M. and T. Douglas. Selective attachment and release of a chemotherapeutic agent from

the interior of a protein cage architecture. *Chem. Comm.* 4:447-449.2005.

Bob's Byte
By Bob Johnston

You may have noticed that spyware has become more of a problem lately. How do you protect yourself?

1) Install at least two spyware programs on your computer. Be sure to update each before you scan your drive to remove unwanted modifications or additions to your computer. I like to use Adaware and Spybot. Be sure that you get a licensed copy of Adaware ($16 from ITC), which gives you a program that runs in memory and alerts you to programs that try to modify your computer.

2) If you have Windows XP, install Service Pack 2. (only after the machine has been cleaned up as in step 1 – if the machine is severely compromised, your machine may not reboot after the upgrade). SP2 has a popup blocker.

3) Things to avoid:
- Music file sharing sites.

- Instant Messenger files. These can be a source of spyware. If you use IM, be sure that you have a couple of anti-spyware programs running in memory – see #1

- Sites that offer to place a shortcut bar in your Internet explorer program. These are a headache, responsible for popup windows and redirecting Explorer to a site other than the one expected. Sometimes they can be almost impossible to remove

- Anytime a site offers to install software, read the license agreement to determine what is being installed. - If you agree to install the spyware, you are bypassing all the protection offered in step 1.

- Avoid sites that offer to scan or speed up your computer.

Google search tip.
Next time you use Google, click on the MORE link located on the Google homepage and you can restrict your search to certain categories. For example, selecting SCHOLAR will restrict your search to scientific articles. Try some of the other choices and see how they function. Good Stuff!!

Pruning methods
By Bob Gough
Shrubs can be pruned by one of three techniques. Each technique has a specific purpose; each produces a specific response in the plant. Thinning out is removing a branch at its point of origin from the parent stem or at the ground level. This results in an open plant and does not stimulate excessive new growth. Considerable wood can be cut off without changing the plant's habit of growth. Plants can be maintained in a healthy condition at a given height and spread for years by thinning out. Use hand shears, lopping shears or small curved pruning saws. Thinning out allows room for growth of new branches. Thin out the oldest and tallest stems first.

With renewal pruning, remove the oldest and tallest branches at ground level over a three-year period, leaving younger, more vigorous branches. On very old plants, remove only 15 to 20 percent of the oldest growth each season until the plant meets your requirements. New shoots replace the old stems and in time are also thinned out. Thin crowded new growth.

Complete rejuvenation or renewal of neglected or overgrown healthy shrubs may be done in one season by cutting all stems to within 1 or 2 inches of the ground before growth begins in the spring. Although this appears to be a drastic method at first, the results of restoring an overgrown shrub occur faster than when the procedure is performed over a 3- to 4-year period. The downside to this process is that the new growth will be "weedy" and will have to be thinned carefully to create a plant with proper density. Shorten long stems to stimulate branching.

Stubs die back and provide entry for pests. The proper pruning cut to a side bud is 1/2 to 3/8 of an inch above the bud and slanted slightly away from it. The preferred pruning cut is to a lateral branch with a diameter equal to that of the branch cut off.

February Birthdays

Mike Sun	2
Elaine Matlow	9
Norm Weeden	12
Alan Dyer	15

Phil Bruckner	17
Megan Hartzell	21
Pam Border	23
Shirley Gerhardt	26

Recipe of the Month

Garden Veggie Pizza Squares

1 (8 ounce) package refrigerated crescent rolls
1 (8 ounce) package cream cheese, softened
1 (1 ounce) package Ranch-style dressing mix
2 carrots, finely chopped
1/2 cup chopped red bell peppers
1/2 cup chopped green bell pepper
1/2 cup fresh broccoli, chopped
1/2 cup chopped green onions

Preheat oven to 375 degrees F (190 degrees C). Roll out crescent rolls onto a large non-stick baking sheet. Stretch and flatten to form a single rectangular shape on the baking sheet. Bake 11 to 13 minutes in the preheated oven, or until golden brown. Allow to cool.

Place cream cheese in a medium bowl. Mix cream cheese with 1/2 of the ranch dressing mix. Adjust the amount of dressing mix to taste. Spread the mixture over the cooled crust. Arrange carrots, red bell pepper, broccoli and green onions on top. Chill in the refrigerator approximately 1 hour. Cut into bite-size squares to serve.